

THE CLAIMS

We claim:

1. A refractory composition consisting essentially of:
 - 5 (a) a magnesia based refractory material;
 - (b) sulfamic acid; and
 - (c) calcia.
2. The refractory composition of Claim 1 wherein the calcia is selected from calcium hydroxide or
10 calcium oxide.
3. The refractory composition of Claim 2 wherein the calcia is selected from calcium hydroxide.
4. The refractory composition of Claim 2 wherein the calcia source is calcium oxide.
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5. The refractory composition of Claim 3 wherein the calcium hydroxide concentration is from
about 1.0 percent to about 8.0 percent by weight of the total refractory composition.
6. The refractory composition of Claim 3 wherein the calcium hydroxide concentration is from
20 about 3.0 percent to about 5.0 percent by weight of the total refractory composition.
7. The refractory composition of Claim 3 wherein the calcium hydroxide concentration is from
about 3.5 percent to about 4.5 percent by weight of the total refractory composition.
- 25 8. The refractory composition of Claim 4 wherein the calcium oxide concentration is from about
1.0 percent to about 8.0 percent by weight of the total refractory composition.
9. The refractory composition of Claim 4 wherein the calcium oxide concentration is from about
3.0 percent to about 5.0 percent by weight of the total refractory composition.

10. The refractory composition of Claim 4 wherein the calcium hydroxide concentration is from about 3.5 percent to about 4.5 percent by weight of the total refractory composition.

5 11. The refractory composition of Claim 1 wherein the sulfamic acid is from about 1.0 percent by weight to about 5.0 percent by weight of the total refractory composition.

12. The refractory composition of Claim 1 wherein the sulfamic acid is from about 2.0 percent by weight to about 4.0 percent by weight of the total refractory composition.

10 13. The refractory composition of Claim 1 wherein the sulfamic acid is from about 2.5 percent by weight to about 3.5 percent by weight of the total refractory composition.

14. The refractory composition of Claim 1 wherein the sulfamic acid is from about 1.0 percent to about 5.0 percent by weight of the refractory composition and the calcium hydroxide is from about 1.0 percent to about 8.0 percent by weight of the total refractory composition.

15 15. The refractory composition of Claim 1 wherein the sulfamic acid is from about 2.0 percent to about 4.0 percent by weight of the refractory composition and the calcium hydroxide is from about 3.0 percent to about 5.0 percent by weight of the refractory composition.

20 16. The refractory composition of Claim 1 wherein the sulfamic acid is from about 2.5 percent to about 3.5 percent by weight of the refractory composition and the calcium hydroxide is from about 3.5 percent to about 4.5 percent by weight of the refractory composition.

25 17. The refractory composition according to Claim 1 wherein the sulfamic acid is from about 1.0 percent to about 5.0 percent by weight of the refractory composition and calcium oxide is from about 1.0 percent to about 8.0 percent by weight of the refractory composition.

18. The refractory composition according to Claim 1 wherein the sulfamic acid is from about 2.0 percent to about 4.0 percent by weight of the refractory composition and calcium oxide is from about 3.0 percent to about 5.0 percent by weight of the refractory composition.
- 5 19. The refractory composition according to Claim 1 wherein the sulfamic acid is from about 2.5 percent to about 3.5 percent by weight refractory composition and calcium oxide is from about 3.5 percent by weight to about 4.5 percent by weight of the refractory composition.
20. A refractory gunning composition consisting essentially of:
- 10 a) a magnesia-based refractory;
b) sulfamic acid;
c) calcia; and,
d) a wetting agent.
- 15 21. The refractory gunning composition according to Claim 20 wherein the calcia is calcium hydroxide or calcium oxide.
22. The refractory gunning composition according to Claim 21 wherein the calcia is calcium hydroxide.
- 20 23. The refractory gunning composition according to Claim 21 wherein the calcia is calcium oxide.
24. The gunning composition according to Claim 20 wherein the sulfamic acid is from about 1.0 percent to about 5.0 percent by weight of the gunning composition; calcia is from about 1.0 percent to about 8.0 percent by weight of the gunning composition; and, the wetting agent is from about 0.05 percent to about 0.5 percent by weight of the gunning composition.
- 25 25. The gunning composition of Claim 20 wherein the sulfamic acid is from about 1.0 percent by weight to about 5.0 percent by weight gunning composition; from about 1.0 percent to about 8.0

percent by weight of the gunning composition is calcium hydroxide; and, from about 0.05 percent to about 0.5 percent by weight of the gunning composition is a wetting agent.

- 5 26. The gunning composition according to Claim 20 wherein the sulfamic acid is from about 2.0 percent to about 4.0 percent by weight of the gunning composition; calcium hydroxide is from about 3.0 percent to about 5.0 percent by weight of the gunning composition; and, a wetting agent from about 0.05 percent to about 0.5 percent by weight of the gunning composition.
- 10 27. The gunning composition according to Claim 20 wherein the sulfamic acid is from about 2.5 percent to about 3.5 percent by weight of the gunning composition; calcium hydroxide from about 3.5 percent to about 4.5 percent by weight of the gunning composition; and, a wetting agent from about 0.05 percent to about 0.5 percent by weight of the gunning composition.
- 15 28. The gunning composition according to Claim 20 wherein the sulfamic acid is from about 1.0 percent to about 5.0 percent by weight of the gunning composition; calcium oxide is from about 1.0 percent to about 8.0 percent by weight of the gunning composition; and, a wetting agent from about 0.05 percent to about 0.5 percent by weight of the gunning composition.
- 20 29. The gunning composition according to Claim 20 wherein the sulfamic acid is from about 2.0 percent to about 4.0 percent by weight of the gunning composition; calcium oxide from about 3.0 percent to about 5.0 percent by weight of the gunning composition; and, a wetting agent from about 0.05 percent to about 0.5 percent by weight of the gunning composition.
- 25 30. The gunning composition according to Claim 20 wherein the sulfamic acid is from about 2.5 percent to about 3.5 percent by weight of the gunning composition; calcium oxide from about 3.5 percent to about 4.5 percent by weight of the gunning composition; and, a wetting agent from about 0.05 percent to about 0.5 percent by weight of the gunning composition.

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31. The gunning composition according to Claim 20 wherein the wetting agent is selected from the group consisting of a superplasticizer, anionic surfactant, cationic surfactant, nonionic surfactant and dispersant.
- 5 32. The gunning composition according to Claim 31 wherein the superplasticizer is selected from the group consisting of a sulfonated naphthalene condensate, polycarboxylic ether and maleic acid copolymer.
33. The gunning composition according to Claim 32 wherein the superplasticizer is a sulfonated
- 10 naphthalene condensate.
34. A method of forming a monolithic refractory lining on a metallurgical vessel, comprising gunning onto at least a portion of the inside surface of the vessel the composition of Claim 20.